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ABSTRACT

This guidebook contains training materials to be used by California elementary and middle-level schools in conducting the Program Quality Review (PQR). The PQR process of curriculum self-review enables the school community to focus, through extensive discussion, on how the school's curriculum and instruction can be improved so that all students can be fully engaged in a high-quality thinking, meaning-centered curriculum. Successful PQR processes occur when there is collaboration among the principal, leadership team, consultants, school site council, and district administration. The guidebook contains samples of overhead transparencies, readings, activities, handouts, and student work. (LMI)

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ED 380 855

PROGRAM QUALITY REVIEW TRAINING MATERIALS

FOR

ELEMENTARY AND MIDDLE LEVEL SCHOOLS

Overhead Transparencies
Readings
Handouts
Samples of Student Work

California Department of Education
Sacramento, 1993

EA 026 476

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Overhead Transparencies
Readings
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Samples of Student Work

Prepared under the direction of the
School Improvement Office
California Department of Education

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PROGRAM QUALITY REVIEW TRAINING

AGENDA

DAY 1

Welcome	
Activity 1:	Why Change?
Activity 2:	Review of New PQR Process
Break	
Activity 3:	Clarifying Roles, Responsibilities, and Relationships
Activity 4:	Constructing Personal Meaning
Lunch	
Activity 5:	Reflecting on Powerful Learning Experiences
Activity 6:	Connecting the Thinking, Meaning-Centered Curriculum to Student Work
Break	
Activity 7:	Connecting to the PQR Subject Areas and Creating Essential Questions
Activity 8:	Closure

OH A-1

PROGRAM QUALITY REVIEW TRAINING

AGENDA
DAY 2

Activity 9:	Connecting Day 1 and Day 2	
Activity 10: Part I **Part II**	Analyzing Student Work	
Break		
Activity 10: Part III **Part IV** **Part V**	Analyzing Student Work	
Lunch		
Activity 11:	Student Learning, Student Work, and Challenges of Change	
Activity 12:	Connecting to Strategies for Improvement of Student Learning	
Activity 13:	Documentation: "The Nitty Gritty"	
Break		
Activity 14:	Expanding Knowledge and Resources for a Successful PQR	
Activity 15:	Closure	OH A-2

Goals of PQR Training for Leadership Teams and Consultants

1. Understanding that PQR is based on applying knowledge of the frameworks to the program in your school

2. Awareness that a common ground for reform exists among PQR and other current efforts

3. Heightened willingness to take risks in PQR

4. Understanding of the new PQR process

OH A-3

The New PQR Process Is a Powerful Tool for Reform

- The goal of the PQR process is improved learning for **all** students.

- This goal supports the vision for California students as presented in the reform efforts.

  - *It's Elementary!*
  - *Caught in the Middle*
  - The frameworks
  - The new California Learning Assessment System (CLAS)

- PQR works together with the other reform efforts to support the goal of improved learning for **all** students.

OH A-4

". . . in order to provide each student in the state an academically and socially empowering education, California's schools need to manage a process of deep, systemic change, which is likely to redefine every aspect of the educational system: curriculum, instruction, assessment, professional roles, and allocation of resources."

— Preface, *Guide and Criteria for Program Quality Review,* California Department of Education, 1994

OH 1-1

Startling Fact #1

- Over half of California's elementary school-age children are Hispanic, black, or Asian.

—*It's Elementary!: Elementary Grades Task Force Report*. Sacramento: California Department of Education, 1992, p. xi. (CBEDS data)

Startling Fact #2

- One out of six students was born in another country.

—*It's Elementary!*, p. xi. (The Los Angeles Unified School District collects data on over 80 different language groups who are learning English as a new language.

Startling Fact #3

- Children from over 80 different language groups who are learning English as a new language make up a full 29% of students entering kindergarten in California.

—*It's Elementary!*, p. xi. (Percentage of kindergarten enrollment provided through data collected in April, 1991, by Educational Demographics Unit, Program Evaluation and Research Division, California Department of Education.)

HANDOUT 1-1a

Startling Fact #4

- In the majority of two-parent families, both parents work outside the home.

—*It's Elementary!*, p. xii.

Startling Fact #5

- As many as 60 percent of California's children may be part of a home headed by a single parent at some time before reaching age eighteen.

—*It's Elementary!*, p. xii. (Kirst, Michael W., and others. *Conditions of Children in California.* Berkeley: Policy Analysis for California Education [PACE], 1989, p. 34.)

Startling Fact #6

- The number of children in the state living in poverty doubled between 1969 and 1987, and if current trends persist, one out of every three children will be living in poverty by the year 2000.

—*It's Elementary!*, p. xii. (Kirst, Michael W., and others. *Conditions of Children in California.* Berkeley: Policy Analysis for California Education [PACE], 1989, p. 50.)

Startling Fact #7

- The incidence of child abuse, neglect, hunger, and homelessness has also increased markedly in the past decade.

—*It's Elementary!*, pp. xii-xiii.

Startling Fact #8

- It is estimated "that 15 percent of babies born in the public hospitals of California's major cities are addicted to drugs or alcohol."

—*It's Elementary!*, p. xiii. ("Explosive Growth, Dramatic Change for California Kids—and a Worsening Future Without Drastic Intervention," *Stanford Educator*, [spring/summer, 1989], p. 1.)

Startling Fact #9

- In 1989, fewer than one-half of recent high school dropouts had a job.

—*California Plan for Career-Vocational Education*, Part I. California Department of Education and Chancellor's Office, California Community Colleges, Sacramento: January, 1989, p. 7.

Startling Fact #10

- The state's teenage pregnancy rate is the second highest in the nation.

—*California Plan for Career-Vocational Education*, Part I. California Department of Education and Chancellor's Office, California Community Colleges, Sacramento: January, 1989, p. 7.

HANDOUT 1-1c

Characteristics of 20th-Century Educational Practice

- Basic skill emphasis
- Job-related training
- Following directions
- Unicultural

— *Constructing a Thinking and Meaning-Centered Curriculum Module*
California School Leadership Academy, 1990

OH 1-2

Citizens of the 21st Century Will Need to Be

- Problem solvers
- Cooperative workers
- Self-starters
- Information managers
- Flexible thinkers
- Multilingual
- Effective questioners

—*Constructing a Thinking and Meaning-Centered Curriculum Module*
California School Leadership Academy, 1990

OH 1-3

The Changing View of How Children Learn

Recent advances in cognitive psychology—the science of how we learn—also have profound implications for the elementary school curriculum. The traditional grade school curriculum consisted of a hierarchical sequence of basic academic skills that students were expected to acquire, often through dogged practice. This approach reflected a view of children as empty vessels that the teacher filled up with knowledge by pouring in an agreed-on inventory of skills in an agreed-on order (from simple to complex, with the most complex "skills" of thinking and problem solving reserved for the later years of education). But modern cognitive research has found that children are actually more like natural scientists bent on making sense of the world. According to this view, all children are quite capable of sophisticated thought processes from the beginning of their formal education. Indeed, they truly learn *only* when they are afforded the opportunity to actively incorporate what they are studying into their own experiences, concepts, and understandings of how the world works. This insight has many practical implications in the classroom, the most important of which is, as Lauren Resnick and Leopold Klopfer wrote in *Toward the Thinking Curriculum:*

. . . the entire educational program must be reconceived and revitalized so that thinking pervades students' lives from kindergarten onward, in mathematics and history class, in reading and science, in composition and art, in vocational and special education.

—*It's Elementary!* (pp. xiii-xiv).

READING 1-1

Why California's Schools Must Change

- A changing population
- A new set of expectations for student outcomes
- New information regarding how students learn

OH 1-4

How Schools Need to Change

- In curriculum content
- In how assessment is done
- In teaching strategies
- In organizational structure

OH 1-5

Goal of the Self-Review Process

". . . to enable the entire school community to focus, through extensive discussion, on how the curriculum and instruction in your school can be improved so that all students in the school can be fully engaged in a high-quality thinking, meaning-centered curriculum."

–Overview, *Guide and Criteria for Program Quality Review*
California Department of Education, 1994

OH 2-1

The New PQR Process

- Facilitates change toward a more powerful thinking and meaning-centered curriculum for ALL students
- Helps schools determine what students are doing and learning
- Encourages schools to engage in continual self-review

OH 2-2

Curriculum Self-Review

- Focuses on only ONE area for in-depth study
- Focuses on analysis of student work
- Promotes increased conversation about the nature, frequency, and depth of student learning
- Analyzes the school environment in the context of curricular improvement

OH 2-3

PQR Quality Criteria for 1994-95

Curricular Criteria:

- Health Education
- History-Social Science
- Language Arts
- Mathematics
- Physical Education
- Science
- Visual and Performing Arts

Instructional Support Criteria:

- Teaching and Learning in the Elementary Grades
- Teaching and Learning at the Middle Level
- Teaching and Learning for Second-Language Learners
- The Improvement Process
- The Learning Environment

OH 2-4

Benefits of the New PQR

- The new PQR is aligned with other curricular reform efforts, such as *It's Elementary!* and *Caught in the Middle.*
- Emphasis on an ongoing self-review process creates an environment for ongoing change and improvement.
- The selection of ONE curricular area is more manageable and is more likely to result in improvement.
- Curricular changes are planned on the basis of student work.
- Leadership teams and consultants work together for change.
- Teachers are actively involved in curricular analysis and the change process.

OH 2-5

Program Quality Review

Preparation

Leadership Team:

- Selects one curricular area.
- Reads and discusses framework.
- Gathers samples of student work to take to training.
- Attends training.
- Plans PQR strategies and time line.

Curriculum Self-Review Process

Leadership Team and School Staff:

- Gather information about student work.
- Compare work with frameworks and curricular criteria and write Student Work Summary.
- Make choices for improvements.
- Develop Improvement Plan.
- Send in PQR Completion Form.

Consultants:

- Work with schools throughout the PQR process as needed.
- Write Visitation Reports.

Implementation and Follow-up

Leadership Team and School Staff:

- Work with school site council to allocate resources.
- Implement and monitor improvements.
- Report annually to community.

Preparation

1. Establish the leadership team.

2. Select one curricular area for in-depth review.

3. Have your leadership team read and discuss the framework for your in-depth area, as well as other relevant documents, including *It's Elementary!* and/or *Caught in the Middle.*

4. Gather samples of student work in the designated curricular area from your school for use during the PQR training.

5. Have three members of your leadership team attend PQR training and make contact with your consultants at the training.

6. Plan strategies for the PQR process for your school, including developing a time line and a plan for working with the consultants.

OH 2-7

Curriculum Self-Review Process

7. Gather information and data about the nature, frequency, and quality of work your students are doing in your area of focus and the features of the program which foster this work.

8. Compare the work your students are doing and producing with the vision set forth in the frameworks and the "Student Work" section of the curricular quality criterion regarding what students ought to be doing and producing, and develop a Student Work Summary.

9. Discuss and make choices about what you are going to do to improve the program and, consequently, the nature and quality of student work in your selected curricular area.

10. Develop a multiyear Improvement Plan, incorporate the activities into your school plan, and report to the community.

11. Send the PQR Completion Form to the School Improvement Office, California Department of Education, through your district office.

OH 2-8

Products

- Student Work Summary
- Improvement Plan
- Visitation Report
- PQR Completion Form

OH 2-9

PQR Products

	Student Work Summary	Improvement Plan	Visitation Report	PQR Completion Form
Product description				
Elem. Guide	Pages 28-29	Pages 37-38	Pages 56-57	Page 46
Middle Guide	Pages 30-32	Pages 40-41	Pages 60-61	Page 49
Appearance in scenario				
Elem. Guide	Pages 29-32	Pages 38-45	Page 57	N/A
Middle Guide	Pages 32-35	Pages 41-48	Page 61	N/A
Sample products				
Elem. Guide	Pages 280-284	Pages 285-293	Pages 294-304	Page 47
Middle Guide	Pages 288-293	Pages 294-300	Pages 301-306	Page 50
Format determined by	Leadership team	Leadership team	Consultants	School Improvement Office
Who is responsible	Leadership team	Leadership team	Consultants	School and district
Audience	School	School, district, and community	School	California Department of Education

OH 2-10

Journal Entry

Considering the goal of the PQR process, the knowledge gained this morning, and your own professional experience, what do you consider to be the critical elements of a successful self-review process?

OH 2-11

Leadership Team's Role

- Lead the self-review by involving staff in gathering student work, interviewing students and teachers, observing students, and analyzing student work.
- Produce a Student Work Summary and Improvement Plan.
- Collaborate with consultants throughout the process.

OH 3-1

Consultants' Role

- Work in two-person teams to help create new understanding about student work, student learning, and the curriculum.
- Serve as "critical friends," assisting schools throughout the PQR process as needed.
- Use their backgrounds and interests in a particular subject area while working with the school.

OH 3-2

Four Rs

Roles: Define roles early to avoid ambiguity and confusion.

Responsibilities: The leadership team and the consultants have a shared responsibility to plan and implement a successful self-review process and to develop a meaningful multiyear improvement plan.

Relationship between consultants and the school is built on a shared professional commitment to improving learning for <u>all</u> students.

Recommendations on process:

1. Consultants take the initiative to contact each other and the school as early as possible.

2. Involve consultants early in the planning before beginning to collect student work.

3. Plan on at least three days of shared time per consultant.

4. Schedule so both consultants can attend together.

OH 3-3

Read, Reflect, Respond

1. In the guide, read and take notes on the consultants' roles and the leadership team's role and responsibilities.

   Elementary Guide: Consultants' roles (pages 52-57), leadership team's role (pages 8-11)
   Middle Level Guide: Consultants' roles (pages 56-61), leadership team's role (pages 8-11)

2. Respond within your group in a dialogue about the role of the leadership team and the possible roles of the consultants and identify what the leadership team might be doing and what the consultants might be doing at various steps in the process.

3. Report out to the large group for a brief discussion.

OH 3-4

"As we enter the 1990's thoughtful educators everywhere are calling attention to the importance of developing students' thinking skills through their experiences in school. . . . Cognitive research reveals that . . . thinking processes can and should be an intrinsic part of good instruction from the beginning of school. Thinking, it appears, must pervade the entire school curriculum for all students from the earliest grades."

—Resnick and Klopfer

— Resnick, Lauren B., and Leopold Klopfer. "An Overview" in *Toward the Thinking Curriculum: Current Cognitive Research*. 1989 Yearbook of the Association for Supervision and Curriculum Development. Edited by Lauren Resnick and Leopold Klopfer. Alexandria, Va: Association for Supervision and Curriculum Development, 1989, p. 2.

OH 4-1

MAJOR THEMES OF A THINKING AND MEANING-CENTERED CURRICULUM

Introduction

Since 1945 the global economic core has shifted from industry and manufacturing to technology and service. Not minerals and metals, but knowledge and information are the new economy's strategic resources. This dramatic change means that, increasingly, employers will expect their workers to be better thinkers and problem solvers. Even the most routine and simple jobs will require higher order thinking skills. Workers will be expected to think abstractly, critically, and creatively; to organize information; and to work cooperatively with others.

For the United States to compete successfully in this new global market, curriculum must be adjusted to reflect the demands of the knowledge-work economy. The thinking and meaning-centered curriculum incorporates the needed adjustments and has the fundamental goal of enabling students to become independent thinkers, discoverers, and inventors. It is a curriculum for all students, not just the educational elite. Five major themes pervade the thinking and meaning-centered curriculum:

- Construction of meaning
- Elaboration beyond content
- Self-regulation of learning
- Connection to existing knowledge
- Interaction within a personally meaningful learning environment

From CSLA Module: Structuring the School for Student Success. Printed with permission.

READING 4-1a

Construction of Meaning

The thinking and meaning-centered curriculum evolved from many years of systematic study about how learners accumulate knowledge. Researchers have discovered that successful learning is more than passive receipt of processed information. It requires active involvement of the learner. Students are not empty receptacles waiting to be filled with knowledge. Rather, they are equipped from birth with innate capabilities to make sense of their environment. In essence, active learners construct knowledge.

In the thinking and meaning-centered curriculum, the teacher's role shifts from conveying information to creating conditions that will lead students to construct knowledge for themselves. The research finding that successful students need meaningful interactions with their learning permeates the thinking and meaning-centered curriculum. For example, elementary students learn history better from superbly written biographies, myths, legends, and historical narratives than from arid textbooks. Eighth graders may learn algebra by applying recently learned concepts, along with data gathering and problem solving, to a physics experiment involving race cars. High school biology students may learn about photosynthesis in the context of the global warming crisis.

The thinking and meaning-centered curriculum equips students with tools for knowledge gathering and knowledge creating; these tools assist students to research, inquire, discover, and invent knowledge on their own. Researchers argue that through such methods, students not only acquire content more quickly and retain it longer, but they also develop processes for knowledge acquisition that will endure for the rest of their lives.

Elaboration Beyond Content

Cognitive scientists assert that learners are not simply recorders of information, but builders of knowledge structures. To know something is not just to have received information but also to have interpreted it and related it to other knowledge. To be skilled is not just to know how to perform some action, but also to know when to perform it and to adapt the performance to varied circumstances.

More specifically, researchers report that highly skilled learners tend to elaborate on and extend new knowledge and to examine it in relation to existing information. Researchers have also found that when elaboration activities are embedded in course content, learning rates soar for average-skilled and low-skilled learners.

Elaboration allows students to make sense of new knowledge in a personal way. Students may expand on their newly acquired knowledge by solving related problems, by exploring associated issues, by making inferences, by researching similar ideas, and by experimenting. For example, eighth graders, after learning evolutionary theory by investigating the dinosaur extinction, create stories, reports, and displays for third graders. Later the eighth graders use their new knowledge of evolutionary theory to explain why New Zealand has no bats.

Substantial research suggests that good thinkers and problem solvers differ from poorer ones not so much in the particular skills they possess, but in their tendency to use them. Elaboration beyond content not only teaches skills and knowledge, it also develops motivation for their later use.

Self-Regulation of Learning

Cognitive scientists explain that effective learners have developed strategies for managing, monitoring, and evaluating their own learning. These self-regulation strategies are integral components of the thinking and meaning-centered curriculum because they are techniques that enable students to "learn how to learn." As students progress intellectually, they become increasingly adept at regulating their own learning.

Self-regulation strategies enable students to:

- Assess the demands of a learning task and devise ways to approach it.
- Evaluate their own learning task and devise ways to approach it.
- Become strongly motivated to assume responsibility for their own learning.

For example, a skilled self-regulated learner and an unskilled one would approach the following problem very differently:

$$\frac{274 + 274 + 274 + 274 + 274}{5} =$$

The skillful student would consider a variety of possible approaches and select the most efficient—seeking a pattern, considering relevant existing knowledge of similar problems, and so on. The unskilled student would simply begin the arduous and unnecessary arithmetic.

The success of self-regulatory activity is, in large measure, a reflection of what a learner knows about his or her own learning characteristics and the demands of the current learning task. Consistently incorporating this information into learning tasks is a central feature of a thinking and meaning-centered curriculum because it strengthens current learning while fostering the capacity of students to learn how to learn.

Connection to Existing Knowledge

One important way in which students make sense of new information is by connecting it to what they already know or have experienced. Recent cognitive research shows that experts on a particular topic—such as mathematics, political science, or technical skills—more easily learn new things related to it than they learn about other topics.

What we have found from this research is that learning about a topic is more effective when it is connected to existing knowledge about that topic. For example, a ten-year-old who knows something about the basic principles of representative government is in a far better position to interpret—and therefore to learn and to apply—new information about the Boston Tea Party and other key events in American history than a child without that knowledge.

This, however, presents teachers with a major dilemma: how to get students to consider and to apply what they already know. Another dilemma for teachers is how to get students to connect existing knowledge directly to a current learning experience. Some consider this a simple memory issue, but research has revealed that this is an issue of how a person organizes and is able to consider and apply the knowledge that he or she has.

In order to promote successful learning, teachers must help students to develop a wide array of techniques to consider, organize, and apply the knowledge that they already have. The thinking and meaning-centered curriculum promotes instructional approaches that consistently incorporate activities such as the following:

- Relating the new information or learning task to students' personal experiences and what they already know
- Using concrete examples and experiences and helping students to find analogies, metaphors, and similes that deepen their understanding of the topic
- Providing opportunities for students to critique and evaluate new information in relation to what they have already experienced and know

Interaction Within a Personally Meaningful Learning Environment

A crucial focus of a thinking and meaning-centered curriculum is on experiences for students that not only engage them intellectually, but also invite their emotional involvement. The recent work of cognitive scientists teaches us that students are most successful when they are learning about things that deal with their real world—with the situations, problems, and experiences that are meaningful to them and which they feel have some bearing on their lives.

The motivation levels of students rise in learning environments that encourage perseverance, allow time to work things out, and do not judge quickly or penalize mistakes. Researchers have found that students care more about learning when they are encouraged to think and when they are involved in an "intellectual wrestling match." They also have discovered that there is usually one of three significant factors that gets someone involved in learning something new—challenge, curiosity, or control.

In a personally meaningful learning environment, students are challenged when working toward identified achievement goals or when solving problems that require investigation because the solutions are not apparent. For example, fourth-grade students create an oral history of the state through an interview process that they design. Later they use the oral history to develop time lines and historical stories.

Curiosity encourages students' attention and inspires them to explore further or to try to resolve puzzles. An example of this is when a group of second graders is gently led to solve the puzzle of how to light up a series of light bulbs by grappling with a variety of batteries, bulbs, wires, and electrical paraphernalia.

A sense of control is increased if the learner is an active agent, directly doing the work and manipulations, rather than observing. Control is increased when students are offered decisions as crucial as choosing what experiment to attempt in a science unit or as peripheral as selecting the color of a racing car in a math game.

A Thinking, Meaning-Centered Curriculum

I. Construction of Meaning

- Active learners construct knowledge.
- Students need meaningful interactions.
- Students need tools to research, inquire, discover, and invent knowledge.
- Teacher's role shifts from conveying knowledge to students to facilitating learning.

II. Elaboration Beyond Content

- Students need to build upon new knowledge.
- Students need to adapt information to new situations.
- Students need to make inferences, research ideas, and experiment.
- Students need to use their skills of thinking and problem solving.

III. Self-Regulation of Learning

- Students need to learn how to learn.
- They need to manage, monitor, and evaluate their own learning.
- They need to consider a variety of approaches and select the most efficient one.

IV. Connections to Existing Knowledge

- Students need to make sense of new information by connecting it to what is known or experienced.
- Students need concrete examples and experiences to deepen understanding.
- Students need to evaluate new information in reference to what is known.

V. Interaction Within a Personally Meaningful Learning Environment

- Simulations need to deal with situations, problems, and experiences that are real.
- Students need a learning environment that encourages perseverance, time to work things out, and the acceptance of mistakes as building blocks.

HANDOUT 4-1

Seven Student-Centered Factors That Enable Students to Create Their Own Meaning from Curriculum Content

1. Engaging in a variety of active experiences—alone, with peers, and with adults—which focus attention on the task at hand and challenge their thinking.

2. Putting their thoughts into words—both orally and in writing—in order to organize and to clarify their thinking and confront their incomplete understanding.

3. Using tangible, real-life experiences and primary source materials which connect to their everyday lives.

4. Creating real, authentic products to demonstrate conceptual understanding of the whole by using and incorporating the parts.

5. Using methods, processes, and vocabularies intrinsic to specific content areas.

6. Putting together complex concepts and applying skills across subject matter boundaries to comprehend content.

7. Weighing personal and/or group values and norms against the ethical implications of what they are learning.

— *Constructing a Thinking and Meaning-Centered Curriculum Module*, California School Leadership Academy, 1990

OH 6-1

Video Viewing Guide

As you watch the video, note examples of the various student-centered factors.

Please be prepared to share the responses to the focus questions in your table group and then to share one idea from the table group with the entire group.

Focus Questions:

What activities did you see in the classrooms that illustrate the student-centered factors?

What did you see children doing?

What did you see teachers doing?

OH 6-2

Curricular Criteria

- Each curricular criterion is based on the framework for that discipline.

- The criteria do not replace the frameworks nor should they be used as substitutes for studying and growing in our understanding of the frameworks and supporting documents (e.g., handbooks, model curriculum guides).

- The curricular criteria provide examples of the type of work students engage in and produce in a high-quality program.

OH 7-1

Read, Think, Share

1. Table groups representing a school divide the pages of their selected subject area criterion for silent reading by each group member. The professional practices section is included.

2. All group members read the focus statement, the focus questions on OH 7-3, and their assigned pages.

3. Each group member shares with the table group the main concepts of his or her reading in relationship to the focus questions.

OH 7-2

Focus Questions

1. How do the examples in your criterion illustrate a thinking, meaning-centered curriculum?

   a. What kinds of work are students engaged in?

   b. What kinds of products and/or performances are they producing?

2. What is the role of the teacher in these examples? (Or, what inferences can you make about the role of the teacher?)

OH 7-3

Creating Essential Questions

The intent of essential questions is to get to the heart of WHAT STUDENTS ARE LEARNING.

- **HOW DO WE KNOW WHAT STUDENTS ARE LEARNING?**

  We look at their work and/or them working.

- **HOW DO WE ANALYZE THAT WORK?**

  We create essential questions that cause us to investigate their work to determine:

  1. The nature/type of work they are doing

  2. The quality of the work they are doing

  3. The frequency with which they are producing specific types of work of specific quality

OH 7-4a

- **HOW DO WE KNOW WHAT THE NATURE, QUALITY, AND FREQUENCY SHOULD BE?**

  A. Look at documents which speak to more general student outcomes:

     <u>It's Elementary!</u>
     <u>Caught in the Middle</u>
     Concepts of the thinking, meaning-centered curriculum

  B. Use content-specific materials:

     Frameworks
     Project materials (i.e., Math Project, Literature Project, etc.)
     PQR criteria

  C. Create questions of "nature," "quality," and "frequency" in regard to:

     Materials listed above
     Performance levels such as those specified by CLAS—by subgroups of students as well as overall school results

- **WHAT DO GOOD ESSENTIAL QUESTIONS LOOK LIKE?**

  They are questions that probe.

  They focus on student learning rather than teachers teaching.

- **DO THE ESSENTIAL QUESTIONS REFLECT THE ENTIRE FRAMEWORK?**

OH 7-4b

PQR—Reflective Feedback on Day 1

What did you expect?	What did you learn?
What did you value?	What do you need?

HANDOUT 8-1

PROGRAM QUALITY REVIEW TRAINING

AGENDA

DAY 2

Activity 9:	Connecting Day 1 and Day 2	
Activity 10: Part I	Analyzing Student Work	
Part II		
Break		
Activity 10: Part III	Analyzing Student Work	
Part IV		
Part V		
Lunch		
Activity 11:	Student Learning, Student Work, and Challenges of Change	
Activity 12:	Connecting to Strategies for Improvement of Student Learning	
Activity 13:	Documentation: "The Nitty Gritty"	
Break		
Activity 14:	Expanding Knowledge and Resources for a Successful PQR	
Activity 15:	Closure	OH 9-1

SAMPLE ESSENTIAL QUESTIONS
for Mathematics
(For use with Activity 10, Part I)

1. What evidence do we have that students use a variety of techniques, including pictures, diagrams, charts, spreadsheets, tables, scatter plots, matrixes, and physical models?

2. Do students themselves make decisions about what they work on and how they do their work? What examples of student work show this?

3. What evidence do we have that students are, over time, becoming more adept at selecting appropriate ways to compute—paper/pencil, computer, calculator, manipulatives?

4. In what ways are students using mathematical techniques and logic to solve problems that have meaning to them and are part of large projects that relate to the "real" world?

5. What evidence do we have that students encounter and use quantities that arise from realistic contexts rather than dealing with contrived problems designed to keep solutions confined to whole numbers?

HANDOUT 10-1

ACTIVITY 10, Part I
STUDENT WORK SAMPLES

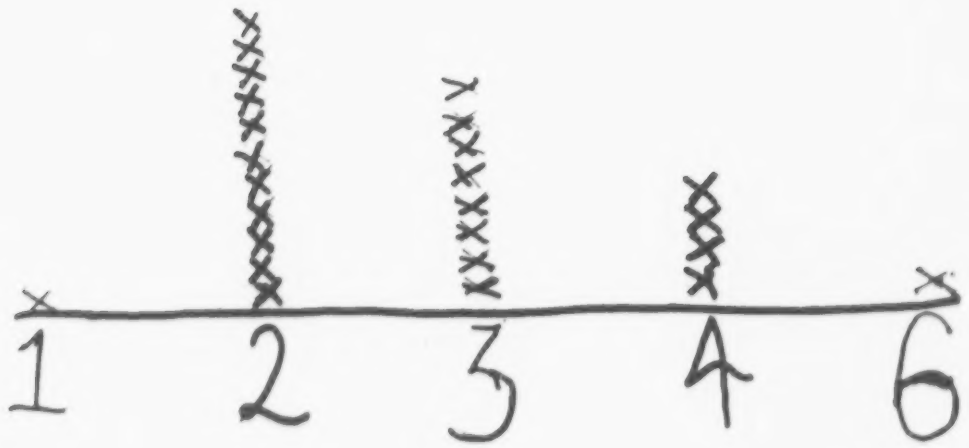
Here is a list of the work in this collection:

Artifact #1,	*p. 95*	Line Plot Graph—"In How Many Languages . . .?"
Artifact #2,	*pp. 97-101*	Scatter Plot Project—"Libraries and Their Books"
Artifact #3,	*pp. 103-105*	Area of a Circle by "Method Two"
Artifact #4,	*pp. 107-109*	Scatter Plot Worksheet
Artifact #5,	*pp. 111-115*	Scatter Plot Project—"Do People Get a Better Grade. . .?"
Artifact #6,	*p. 117*	Division Worksheet
Artifact #7,	*pp. 119-135*	Individual Project—"WORK"

HANDOUT 10-2

In How Many Languages Can You Count to Ten...?

number of languages	number of people
1	1
2	11
3	8
4	4
6	1



Range = 5

Mean = 3.12

Median = 3

Mode = 2

Correlation? Cause and Effect?
Individual Project

ASSIGNMENT

- Select two qualities that are measured or counted that you think may be related. The qualities may apply to people or things. One of the qualities may be from the Data Collection Sheet, but not both. (Note: Items 1, 3, and 4 from the Data Collection Sheet can't be used since these items aren't measured or counted.) At least one of the qualities you collect data on must be of your own choosing.

- Collect new data (don't use old class data) by surveying for the two qualities on at least 20 different items, people, trials, oranges, etc.

- Make a scatter plot for the data pairs.

- Comment on the correlation of the data. Do the two items appear to be related? If there appears to be a relationship, tell why. If there is no relationship tell why not.

- Speculate about cause and effect.

JUDGING QUALITY

Well done
The scatter plot is precise and attractive. Comments are written in complete, understandable sentences. Correlation is discussed. (It is not necessary to get a high correlation in order to have a well done report). Cause and effect is discussed. Thirty or more data items are surveyed.

Acceptable
The scatter plot is accurately drawn. Twenty data pairs are displayed. Comments about correlation, cause and effect are included.

Revision needed
Graphs need more accuracy. Scales are not consistent. Not enough is written about the implications of the scatter plot.

Restart
Inappropriate qualities were chosen (Be sure to get teacher approval of the qualities you will survey before you start to avoid this problem.) If the data on qualities is not variable enough to decide about correlation or the same qualities or data as other students has been used, you may have to restart with different qualities.

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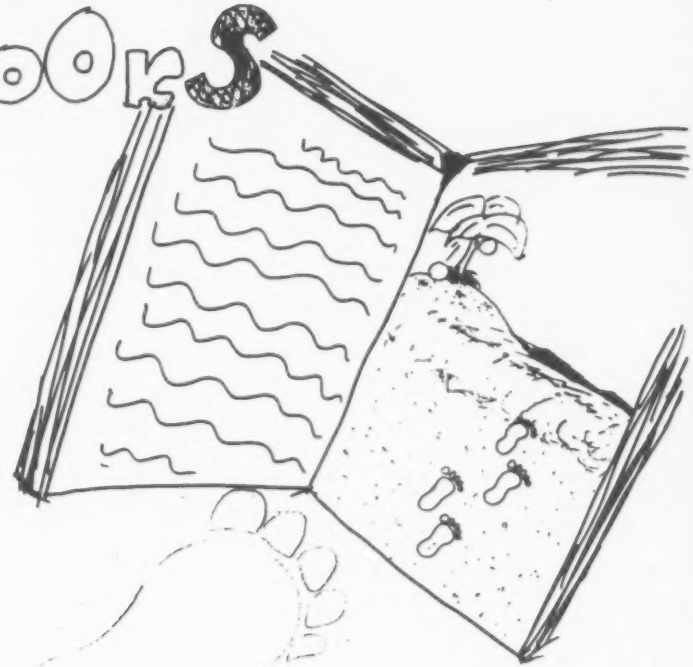
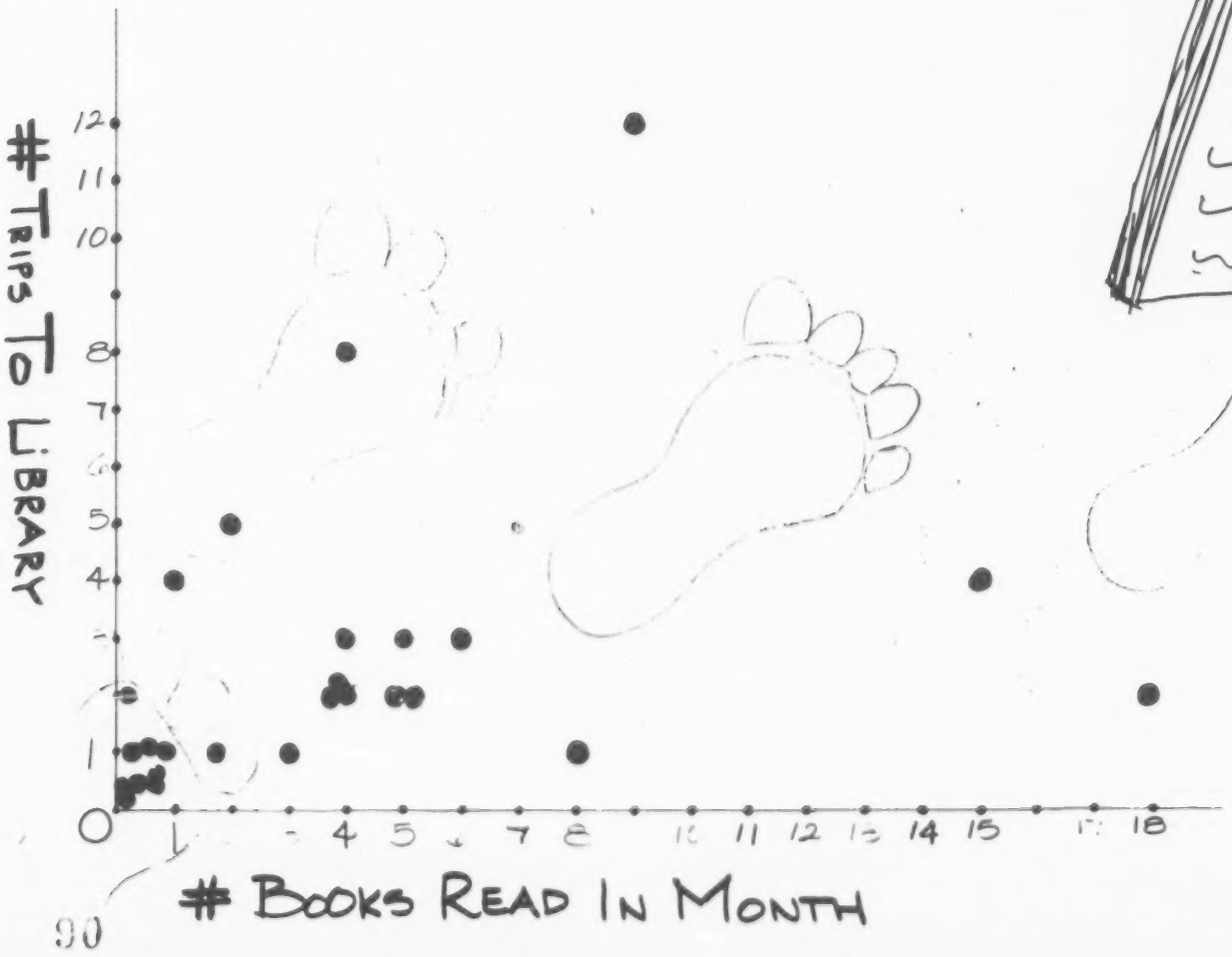
ARTIFACT 2A

LIBRARIES AND THEIR BOOKS





90

Summary

We found that there was no correlation between number of books read in a month and number of trips to the library (in a month). We expected no correlation because the number of books read doesn't have much to do with the library. Some people read books not from the library. They could have other sources like the book store or some read from their library at home.

Some people; as our graph shows have neither read any books or made any trips to the library, but some people could go to the library to study and not check out any books.

We expected no correlation though, and we didn't find one either.

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Method 2

Inscribing and Circumscribing Squares

Analysis - This method makes mathematical sense because we are Circumscribing, finding the area of a circle, and Measuring. Our group feels that this method is accurate and fair. We think it works.

Result: 3in. length × 3in. width = 9in. (large square)

2in. length × 2in. width = 4in (smaller square)

9 in
+4 in
13 in

$$2\overline{)13.0}\quad 6\,6.5$$
$$12$$
$$10$$
$$10$$
$$0$$

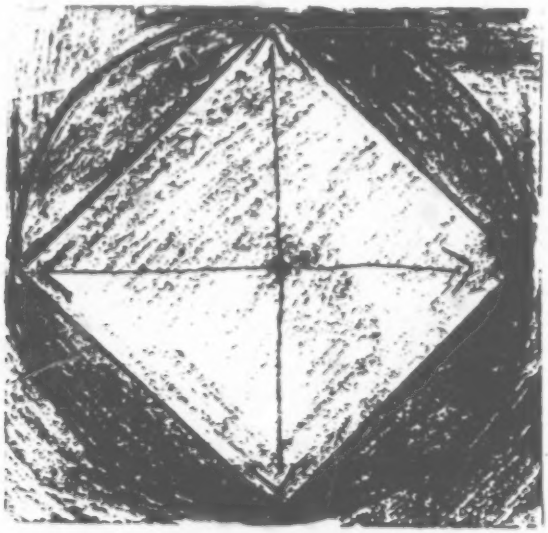
6.5 inches is the area of the circle.

Description - Our group made a square outside of the circle given. We made sure that all the sides were equal and

- 103 -

ARTIFACT 3A

Method 2 (continued)
that the sides of the circle match the outside of the square. We then made a square inside of the circle that was in a diamond shape. The corners of the square inside the circle had to touch 4 of the sides of the circle. Our group found the area of both squares, we then added those areas together and divided by 2. We got 6.5 inches as the area of the circle.

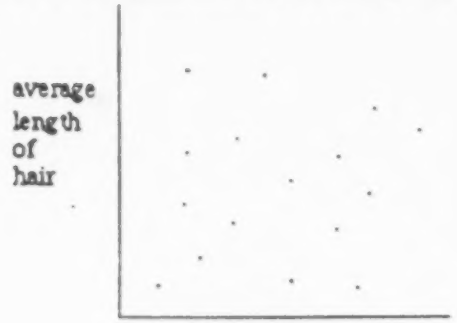


ARTIFACT 3B

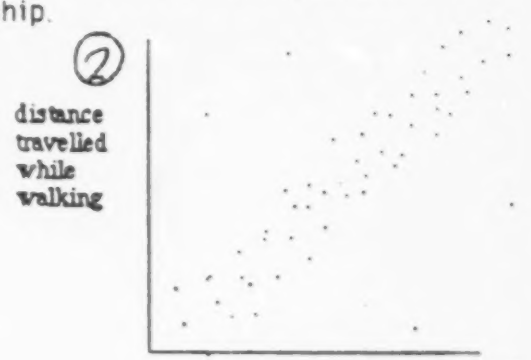
Name_____ Period_____

Draw in some points to show the pattern each scatterplot might have.
Write a sentence describing the relationship.

(1)

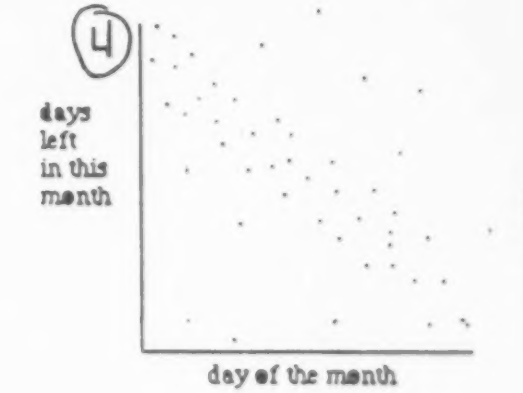


(2)

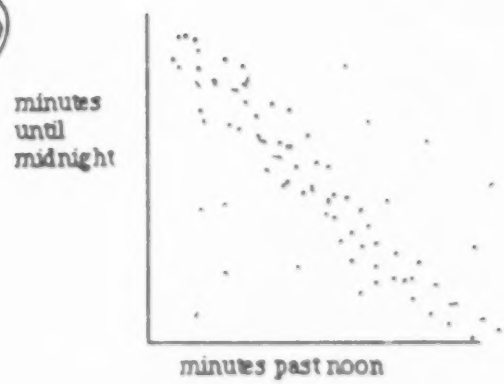


(3)

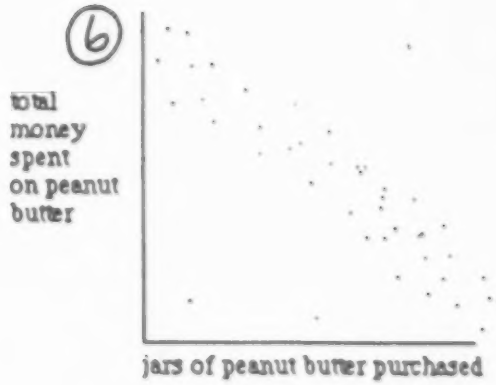
(4)



(5)



(6)



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1) They have nothing to do with Each other.

2) They faster you walk the farther you will go.

3) I messed up there is supposed to be a positive correlation.

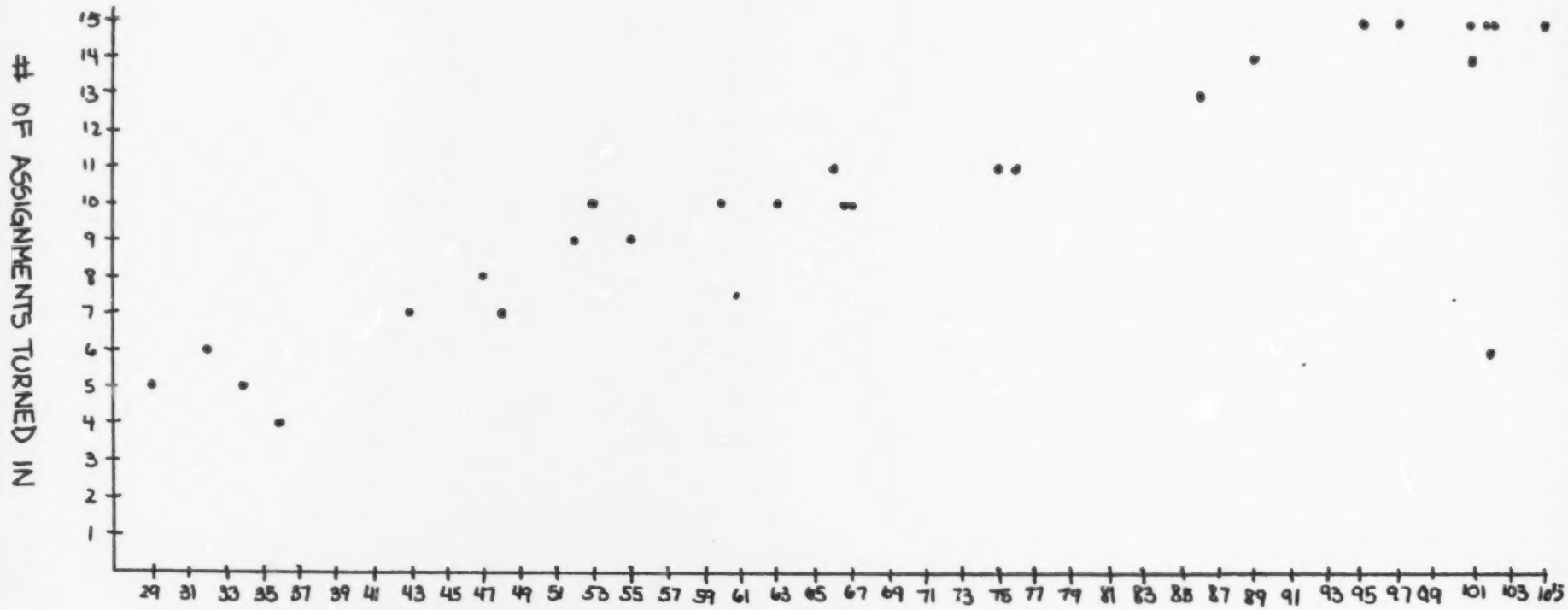
4) The earlier in the month the more days left.

~~5) have nothing to do with each other.~~

6) The more money you spend the more jars you have.

5) The less minutes past ~~noon~~ noon the more minutes past midnight

DO PEOPLE GET A BETTER GRADE IF THEY TURN IN MORE ASSIGNMENTS?



ARTIFACT 5A

97

98

5/29/92
Math

Period 6

Do People Get Better Grades if They Turn in More Assignments?

Scatterplot Project

I did my scatterplot based on these two questions: What is your grade average? and How many assignments did you turn in? I got all my information of the grade chart for the students of this class. I suspected that there was a relationship between these questions and there would be a positive correlation in my scatterplot. After I made my scatterplot I found that it did have a positive correlation because I could tell that as the grade averages got higer, the more assignments were turned in, but this was a fairly weak correlation. For example a person got 102% and only turned it 6 assignments. Another example of this in my scatterplot is that the person who turned in 4 assignments got a higher grade average than the two people who turned in 5 assignments

I concluded that there was a sort of cause and effect to these questions. The cause is if you turn in more assignments then the effect would be

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ARTIFACT 5B

Individual Project Self-evaluation Sheet

(Hand this sheet in as the cover of your project)

NAME_____ PERIOD 6

CHECK OFF, OR WRITE THE DATE, IN THE SPACE BESIDE EACH ITEM AFTER YOU HAVE COMPLETED IT.

✓ The two items I am gathering data on in order to see it there is a relationship are:

what is your grade [redacted] average in math?

How many assignment did you turn in?

✓ My scatterplot is neatly drawn with equal spaces on each axis representing equal quantities.

✓ The number of items or people I measured or surveyed is 2 7.
(More then 20, preferably 30.)

✓ My data points are carefully plotted.

✓ I completed a written discussion of whether the scatterplot shows there might or might not be a relationship.

✓ I completed a written discussion of whether there is a reason to expect cause and effect between the two items.

✓ Overall I rate the quality of my work on this project as (circle one):

(well done) acceptable more work needed

My other comments are:

I don't think scatterplot exactly prove anything because they only show you a part of the facts. There [redacted] usually will be a circumstance that will show scatterplots aren't quite true.

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Math Per 4

15/16

Solve: Show work . Answer in Answer column

.Answer column

1.	.27
2.	.17
3.	.069
4.	.012
5.	.042
6.	.2386
7.	4991.1848
8.	86,536.4880

Divide

1) $81.2 \div 16$

$16 \overline{)81.2}$ → .27, 16, 56, 32, 240

2) $5.61 \div 33$

$33 \overline{)5.61}$ → .17, 33, 231, 231, 0

3) $0.552 \div 8$

$8 \overline{)0.552}$ → .069, 48, 72, 72, 0

4) $0.864 \div 72$

$72 \overline{)0.864}$ → .012, 72, 144, 144, 0

5) $3.486 \div 83$

$83 \overline{)3.486}$ → .042, 332, 166, 166, 0

6) $29.825 \div 125$

$125 \overline{)29.8250}$ → 238.6, 250, 482, 375, 1075, 1000, 750, 750, 0

Multiply

7) 8912.83×0.56

8912.83
× 0.56
534769 8
4456415 0
4991.1848

8) $0.152 \times 82,510 \times 6.9$

0.152
× 82,510
0000
01520
076000
0304000
1216000
12541.520

12541.520
× 6.9
112873680
75249 1200
86536.4880

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Individual Project: PREDICTING CHANGES

The petals of a growing flower, the national debt, a fad sweeping the school, a contagious disease within a population, the temperature of a cup of coffee, the diameter of a tree; these and many other things change with time. Some increase in size or get larger in quantity. Others shrink in size or get smaller.

ASSIGNMENT

Select something that interests you that either grows or shrinks over time. Use the methods of this unit to make predictions about changes in the future. Before you begin actual work you need to check with your teacher and explain your ideas for the project see if it is acceptable. Your project must satisfy the following criteria:

1) It deals with something that increases or decreases over time;

2) the change is quantifiable; it can either be measured or counted;

3) there is a reason for making a prediction of future changes;

4) an audience exists for whom the predictions are relevant; and

5) the mathematical methods studied in this unit can be used for making the predictions;

6) the predictions are based on real data that you either look up or gather yourself.

Your report should be written for an audience such as a company, government agency, research institute, other math students, etc. In addition to using several methods to make predictions, your report should also include a discussion of how appropriate each prediction method is for the situation and some implications of what might happen if your predictions come true. Include a disclaimer statement that tells why your predictions may not come true.

JUDGING QUALITY

A ***Well Done*** report consists of a predictions for something that either increases or decreases over time. The source of the data on which the predictions are based is given. Both the "add-on" and the "multiply" methods of prediction studied in the Growth Patterns unit are used and compared. Graphs of each are shown. A third method of predicting may be devised and used. Specific recommendations are made based upon the predictions. The disclaimer statement not only describes events which may cause the predictions to be invalid, but also includes rough estimates of the probability of each event occurring and estimates the effects of each event on the predicted numbers. The format of the report is neat and orderly and addressed to the appropriate audience.

To be ***Acceptable***, a report must include most of the parts of a well done report, but a third method of predicting is optional. In the disclaimer statement, estimates of the probabilities of events affecting the predictions are optional.

A ***Revision Needed*** report may be the basis for an acceptable or well done report, but may need more work on the data sources, predictions, disclaimer statement, or format. A *Revision Needed* report will be returned for further work until it is acceptable.

Restart. A reminder: before beginning work, check with your teacher. If the particular thing chosen has very little change over time, or the methods studied in this unit for predicting are not appropriate, then something else must be chosen or one of the other individual project options must be selected and the report started over.

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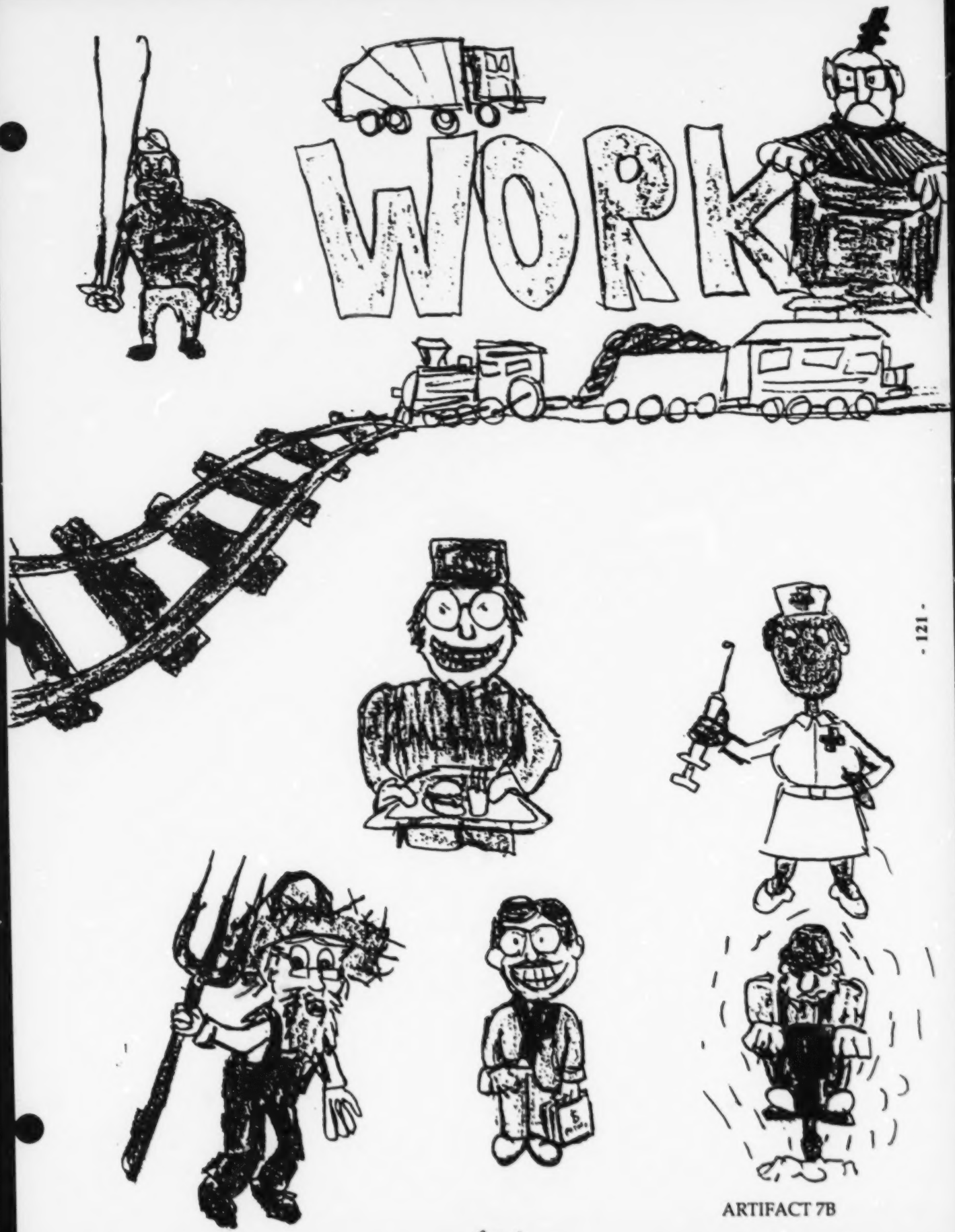


ARTIFACT 7B

WORK

Weekly Work Hours 2

Income 4

Work Hours Chart 5

Graph 6

Conclusion 7

ARTIFACT 7C

Weekly Work Hours

Over the last century or so, work hours per week has been dropping. It has been slow and not very steady, every once in a while changing in dropping rate. All together it has gone down 29.5 in the last 150 years. I figured out the U.S. will work 37.055 hours per week. in the year 2010

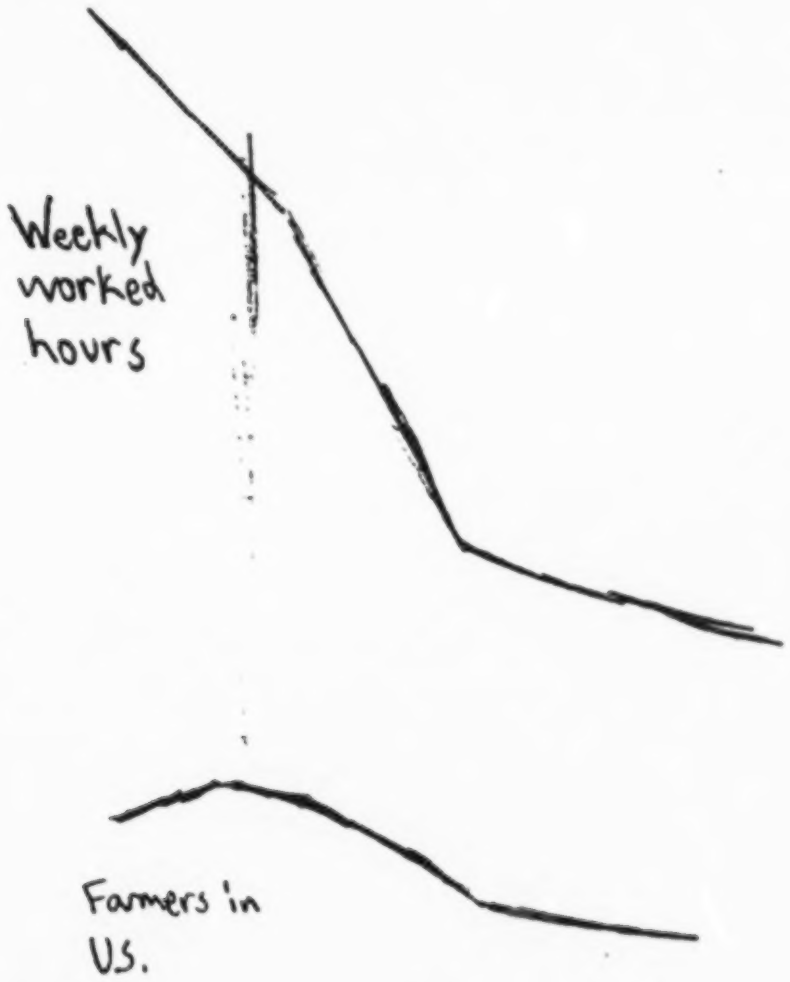
Figuring Out

Solving the problem of a projection for the year 2010 was a difficult one. I decided I would do an add-on exansion, adding to the drop one certain number every 10 years and then finish adding until 2010, except the annual drop changed every 50 years. This gave me some difficulties, but I worked it out doing the add-on for every 50 years and finnaly figuring out an average change in the annual change. Ending off the current 50 year cycle in the year 2000 and starting a new on for 2010.

? Why ?

I asked myself what makes the weekly hours go down. First I thought

technoligy grows making less worters needed, but that is a different story. Next I thought it might be work related. I compared graphs of job increase and hourly increase(page). I noticed the drop in hours worked was simaler to the drop in farming. I started thinking and realized farming is probably the most time consuming job and the less it is don the less the U.S. works week.



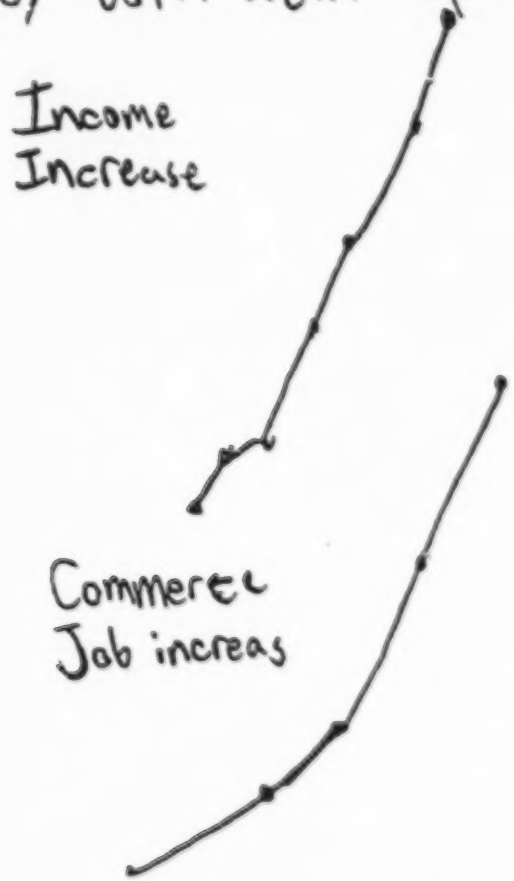
ARTIFACT 7E

Income

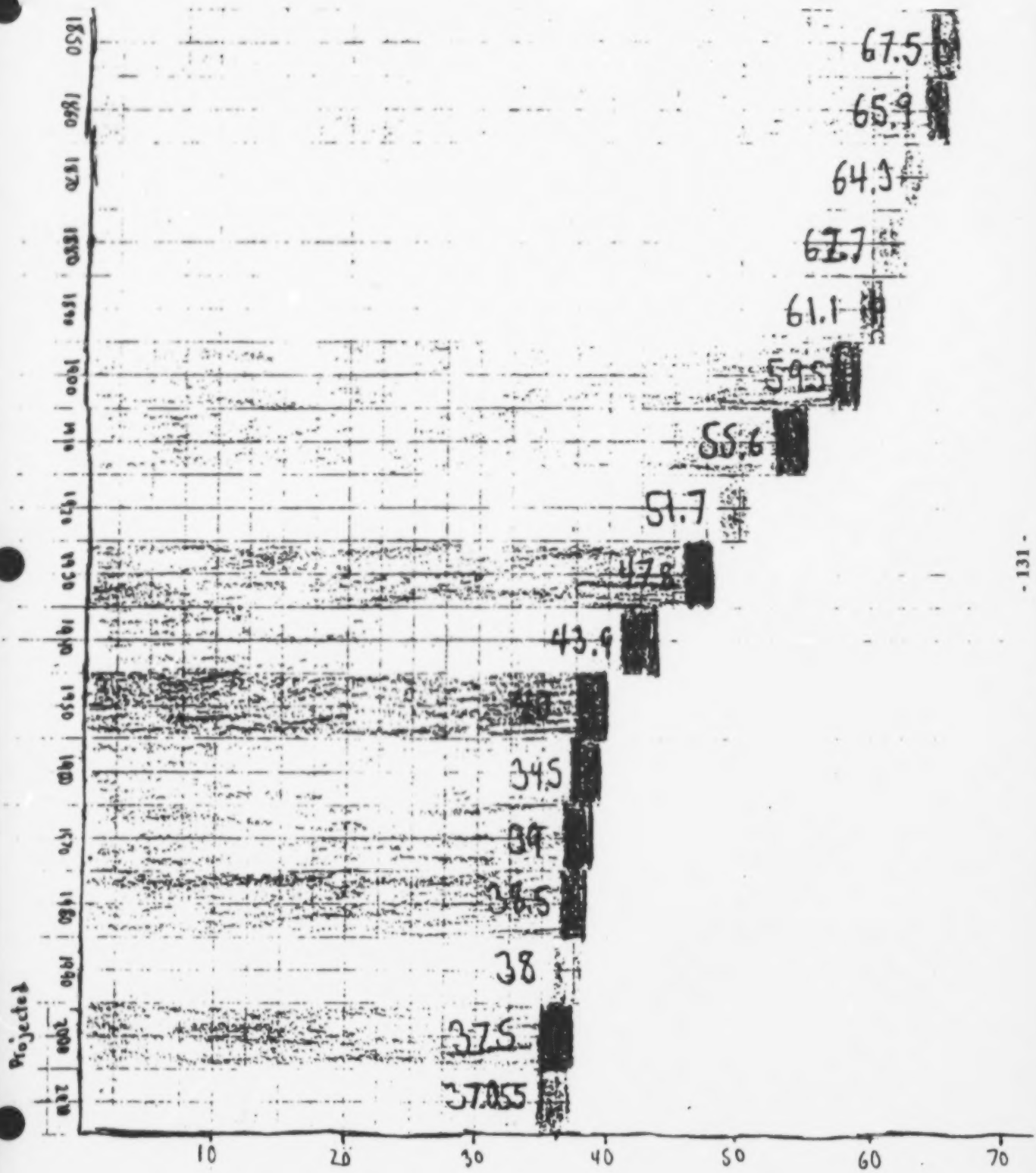
Figuring out the income of the U.S. was a little easier. Income pretty much had a steady growth so I simply added on to what was there already.

? Why ?

The Income growth I found to be very close to the growth in Commerce (Buisness). They both went up at a very identical rate



Weekly Work Hours from 1850-1990(2010)



ARTIFACT 7G

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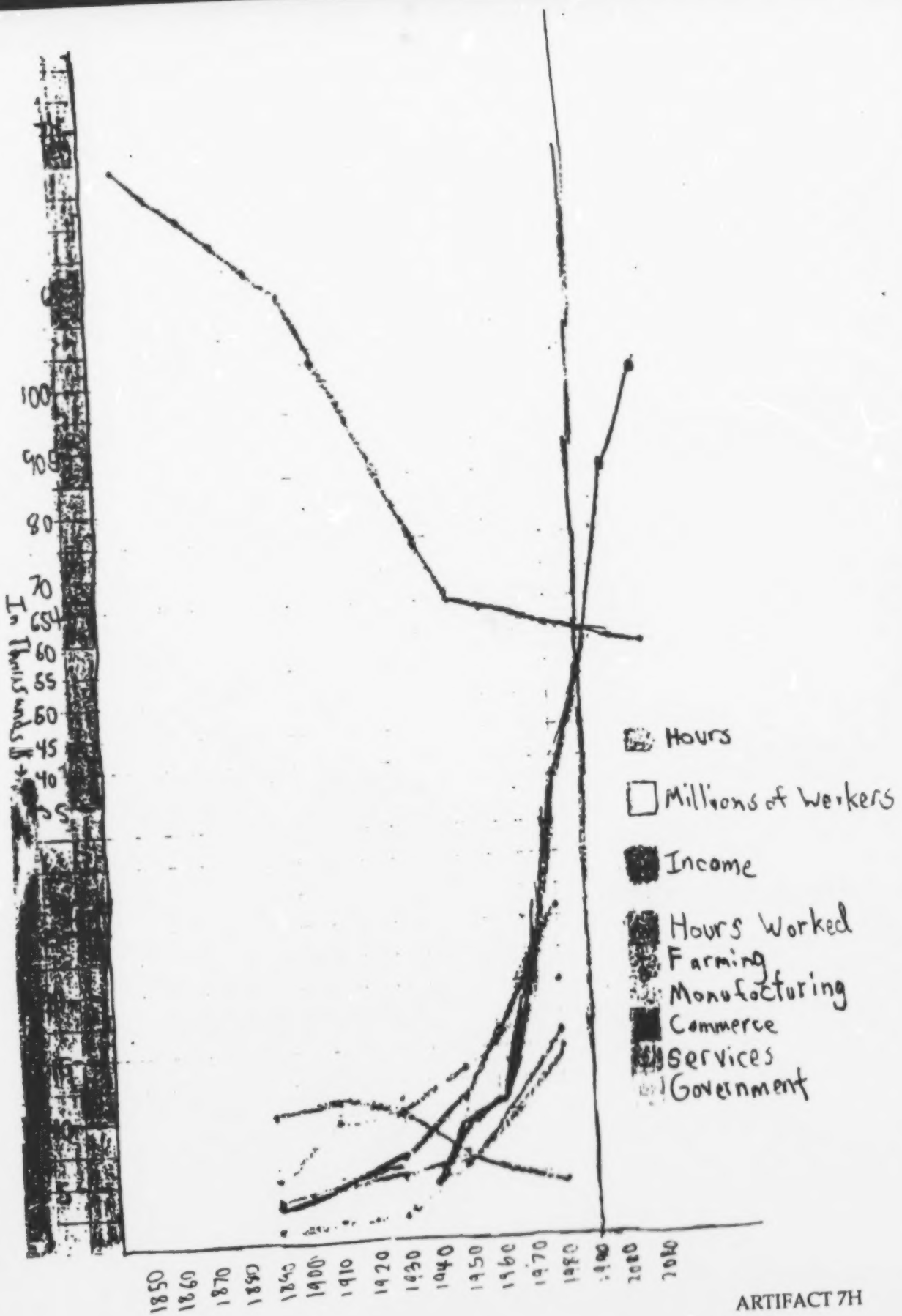

ARTIFACT 7H

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Disclaimer

Because of the subject here being work dealing with the economy I am not to sure how accurate this study is. Recession can strike at any time, as like now. And with an instead economy anything can happen. Even with the shaky economy I feel this study is accurate.

Conclusion

In conclusion I find if someone wants to know which job would be best, I would say Commerce (Buisness). Commerce pays the best and has pretty much small work hours. In this report I had to skip the multiply-by because of the complexity of the changing.

Interveiw

My interveiw (Bo Stevenson) first opinion was he liked the cover. He found the report informative but not as direct as he felt it should be. He disagreed with my conclusion thinking that baseball will be the best job.

ARTIFACT 71

CLAS
California Learning Assessment System

Sample Open-Ended Mathematics Task
Grade 4

The Vending Machine

Maria wants to buy a 75-cent snack from a vending machine. The machine takes only nickels, dimes, and quarters. Maria has 7 nickels, 5 dimes, and 2 quarters.

Part 1
Show all of the different ways she could pay for the snack. You may use words, diagrams, or charts.

Part 2
Which of your ways uses the **fewest** number of coins? Explain why this is true.

What Students Are Expected to Accomplish Mathematically (Essence Statement)

This task first asks students to show all the different combinations of a specified number of nickels, dimes, and quarters that equal 75¢. Students are then asked to identify the combination that uses the fewest number of coins and to explain why this is true.

To fully accomplish the purpose of this task, students generate the different combinations of 7 nickels, 5 dimes, and 2 quarters that make 75¢. Students demonstrate their understanding of addition, money, and their ability to find and use mathematical patterns. Students might organize the information by using lists, charts, drawings, or written descriptions. Additionally, students indicate which of their combinations uses the fewest number of coins and to explain why it's the correct answer.

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CLAS
California Learning Assessment System

Sample A - Student Response to "Vending Machine"

Part 1

1. 2 quarters
   2 dimes
   1 nickel
2. 2 quarters
   1 dime
   3 nickels
3. 2 quarters
   5 nickels
4. 1 quarter
   5 dimes
5. 1 quarter
   4 dimes
   2 nickels
6. 1 quarter
   3 dimes
   4 nickels
7. 1 quarter
   2 dimes
   6 nickels
8. 5 dimes
   5 nickels
9. 4 dimes
   7 nickels

Combination of Coins

Part 2

The first way uses the fewest number of coins. Ways 2-9 use 6-11 coins, way number 1 uses 5 coins. To me it is weird how 5 coins and 11 coins could equal the same amount of money. After I looked over it, I understand

Commentary: A description of the student response, written by a team of teacher scorers

Response shows a very systematic list of all nine possible combinations of coins. Explanation correctly gives 2 quarters, 2 dimes, and 1 nickel as a combination with fewest (5) coins and notes that other combinations used between 6 and 11 coins. Response notes that different numbers of coins can make a single amount.

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CLAS
California Learning Assessment System

Sample B - Student Response to "Vending Machine"

Part 1

	25¢	5¢	0¢	
1	2	1	3	
2	2	5	1	
3	1	6	3	
4	0	7	4	
5	1	0	5	
6	0	5	5	
7	1	2	4	
8	2	2	1	
9	2	4	3	

Part 2

Nummber 5 has the least amount of coins. Because I have 6 coins, a qurter, and 5 dimes wich equles 75¢, and all of the other nummbers have more coing.

Commentary

Response shows nine combinations, four of which meet the constraints and equal 75¢. Explanation notes that 1 quarter and 5 dimes has the fewest (6) coins, omitting mention of the incorrect combinations on the chart.

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CLAS
California Learning Assessment System

Scoring Guide (Rubric)

- **Score Point 4. Fully accomplishes the purpose of the task.**
  Shows full grasp and use of the central mathematical idea(s). Recorded work communicates thinking clearly, using some combination of written, symbolic, or visual means.

- **Score Point 3. Substantially accomplishes the purpose of the task.**
  Shows essential grasp of the central mathematical idea(s). In large part, the recorded work communicates the student's thinking.

- **Score Point 2. Partially accomplishes the purpose of the task.**
  Shows partial but limited grasp of the central mathematical idea(s). Recorded work may be incomplete, misdirected, or not clearly presented.

- **Score Point 1. Little or no progress toward accomplishing the task.** Shows little or no grasp of the central mathematical idea(s). Recorded work is barely (if at all) comprehensible.

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CLAS - CALIFORNIA LEARNING ASSESSMENT SYSTEM
PERFORMANCE LEVELS
MATHEMATICS

Level 6
Student work demonstrates rigorous mathematical thinking and in-depth understanding of essential mathematical ideas. Responses meet and often exceed expectations; they are consistently correct and complete, and use appropriate representations (for example, words, diagrams, graphs, pictures). Student work extends concepts or produces related conjectures. Generalizations and connections are supported by precise logical arguments using multiple or unique approaches and appropriate mathematical tools and techniques.

Level 5
Student work demonstrates solid mathematical thinking and full understanding of mathematical ideas. Responses fully meet expectations; they are usually correct and complete, and use appropriate representations (for example, words, diagrams, graphs, pictures), although sometimes containing minor flaws. Some of the student work contains generalizations and connections supported by effective arguments using multiple or unique approaches and appropriate mathematical tools and techniques.

Level 4
Student work demonstrates substantial mathematical thinking and understanding of essential mathematical ideas, including appropriate representations (for example, words, diagrams, graphs, pictures). Responses are usually correct although the work may contain flaws. Student work exhibits appropriate use of mathematical tools and techniques.

Level 3
Student work demonstrates partial mathematical thinking and understanding of mathematical ideas. Some responses are correct; however, gaps in conceptual understanding are evident and representations (for example, words, diagrams, graphs, pictures) need elaboration. There is an acceptable use of tools and techniques.

HANDOUT 10-3e

CLAS - CALIFORNIA LEARNING ASSESSMENT SYSTEM
PERFORMANCE LEVELS
MATHEMATICS
PAGE 2

Level 2
Student work demonstrates limited mathematical thinking and understanding of mathematical ideas. While responses are sometimes correct, student work often falls short of providing workable solutions. Tools and techniques are rarely used or are used inappropriately.

Level 1
Student work demonstrates little or no mathematical thinking and understanding of mathematical ideas. Responses show little or no progress toward accomplishing mathematical tasks. There is little correct or appropriate use of tools, techniques, or representations.

HANDOUT 10-3f

Key Ideas Regarding Student Work

Emphasis on student learning

Student work includes:

- Essays
- Reports
- Project products
- Tests
- Journals
- Portfolios
- Open-ended responses

Students working includes:

- Oral presentations
- Discussions
- Individual and group work
- Investigations and experiments

Collecting student work includes:

- Looking at student work products
- Making observations of student working
- Monitoring student progress over time
- Having students do self-assessment
- Interviewing students

Collecting Student Work

- Each group should generate a short list of logistical issues.
- The group then shares this list with their consultant team.
- The consultant team listens to the issues and provides feedback and consultation by posing such questions as, "Have you thought about. . . ?"

Skim and Highlight the Instructional Support Criteria

- Teaching and Learning in the Elementary Grades Criterion or Teaching and Learning at the Middle Level Criterion
- Learning Environment Criterion
- Improvement Process Criterion
- Teaching and Learning for Second-Language Learners Criterion

OH 12-1

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CAUTION ! ! !

DO NOT FIND SOLUTIONS OR

WRITE REPORTS TODAY!

YOU HAVE NOT YET DISCOVERED

YOUR NEEDS FROM THE IN-DEPTH

ANALYSIS OF STUDENT

WORK AT YOUR SCHOOL.

OH 12-2

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Journal Revisit

Revisit your first journal entry from yesterday's Activity 1, on your feelings with regard to the new PQR.

Reread that entry; make additions, revisions, and/or deletions to reflect your current understanding and feelings.

OH 15-1

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Excellent schools absolutely depend on excellent teachers.

Excellent teachers are involved, strong, proud people.

Strong, proud people take jobs which entrust them with important things. These jobs are structured in such a way that people can effect their own success.

Schools will be successful only if we give teachers the authority to make important decisions which affect the success of their jobs.

PQR—Reflective Feedback on Day 2

What did you expect?	What did you learn?
What did you value?	What do you need?

HANDOUT 15-1

Journal

- Activity 1

- Activity 2

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Journal

- Activity 15

Preliminary Planning Work Sheet

- Activity 11

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- Activity 12

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Preliminary Planning Work Sheet

- Activity 13

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- Activity 14

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